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THE PLANT DISEASE BULLETIN

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The Plant Disease Survey

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THE PLANT DISEASE BULLETIN

Issued by

THE PLANT DISEASE SURVEY

Vol. III Number 4

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BARLEY

Stripe caused by Helminthosporium gramineum.

Idaho: (Hungerford, July 27.) Noted in a number of different places in the state. Only a trace in many fields examined.
South Dakota: (Champlin, August 1.) 1% or less.
Wisconsin: (Vaughan, August 1.) Few fields have more than trace, very markedly less than last year. Probably a result of unfavorable climatic conditions as the two hour treatment was not general.

Stem rust caused by Puccinia graminis.

Idaho: (Hungerford, July 27.) Reported from one locality and not serious there.
Iowa: (Melhus, August 1.) About 25% affected area.
South Dakota: (Champlin, August 1.) 10-15%.
Wisconsin: (Vaughan, August 1.) More than usual but not so serious as on other grains.

Loose smut caused by Ustilago nuda.

Idaho: (Hungerford, July 27.) Very little noted this year.
Iowa: (Melhus, August 1.) 1% as average for the state.
South Dakota: (Champlin, August 1.) 2% as average for the state.
Wisconsin: (Vaughan, August 1.) Loss slight, Less than usual.

Covered smut caused by Ustilago hordei.

Idaho: (Hungerford, July 27.) Very little.
Iowa: (Melhus, August 1.) 1% for the state.
South Dakota: (Champlin, August 1.) 1% or less.
Wisconsin: (Vaughan, August 1.) Loss slight. Less than usual.

Other diseases.

Scab, caused by Fusarium spp., was reported as causing 5% infection of barley in Iowa August 1, and 2-3% infection in South Dakota on that date.

Ergot, caused by Claviceps purpurea, has been reported from Grant and Dane Counties, Wisconsin.

OATS

Smut caused by Ustilago avenae and U. levis.

Virginia: (Fromme, July 15.) Both smuts prevalent about as usual. Will average 3-4% for the state. Oats are not an important crop. They are cut for hay in some sections.

(Results of Cereal Disease Survey, June 4 - June 12.) Covered smut was found in two out of five fields inspected, a trace being present in each case. None of the farmers treated their seed.

Loose smut was found in four out of five fields inspected in amounts ranging from a trace to 35%.

Washington: (Heald, July 15.) Covered smut present in eastern Washington this year and several cases of loose smut noted in western Washington.

Other diseases.

Tip burn, attributed to hot, dry weather, is reported by Gardner from Indiana, August 1. Many complaints are being received in that state concerning a brown, discoloration at the tips of the leaves.

Leaf spot, caused by Helminthosporium sp., is reported by Gardner as quite general throughout the state of Indiana, although of small economic importance. Helminthosporium avenae is also reported from Clark and Snohomish Counties, Washington.

Frost injury is reported by Heald from Washington, July 15. It is characterised by a general reddening of the leaves and stunted or poorly filled panicles.

Red leaf, caused by Bacteria, is reported by C. R. Orton, June 21, from Pennsylvania. It is extremely prevalent all over the state but does not appear to be harming the oats much up to June 21. It was very conspicuous. Some of the reddening may be due to aphis also.

Anthracnose, caused by Colletotrichum cereale, was found by field men of the Cereal Disease Survey in Virginia in two out of five fields inspected. In one case it was slight and in the other case abundant.

Stem rust, caused by Puccinia graminis, was found in Virginia in one out of five fields inspected in the Cereal Disease Survey.

Blast, non-parasitic, was found in Virginia in four out of five fields inspected in amounts ranging from slight to moderate.

Leaf rust, caused by Puccinia coronata, was found in Virginia in three out of five fields inspected in amounts ranging from 3-5% affected leaf area.

POTATO

Late Blight caused by Phytophthora infestans.

Alabama: (Peltier, June 1.) No reports or observations this spring.

Connecticut: (Clinton, July 25.) Has not been found in the state as yet.

Georgia: (McClintock, August 1.) None observed on late harvest of spring crop. Second crop not up yet as it is being retarded by rain.

(Berry, June 1.) A few reports from sections of early Irish potatoes. No marked damage to vines until digging time. In a few cases about Savannah it resulted in a wet rot of the tubers. Weather wet at digging time.

Iowa: (Melhus, August 1.) No late blight as yet.

Louisiana: (Edgerton, August 1.) Have seen none this season.

Massachusetts: (Osmun, August 1.) First observed July 24 in Berkshire County. Infections slight.

New Jersey: (Cook, August 2.) So far as I know we have not had this disease in the state this season. A few suspicious specimens were found but a laboratory examination proved the trouble to be due to other causes. Many fields examined.

North Carolina: (Dr. Jehle, August 1.) "In Avery County there is also an epidemic of late blight on Irish potatoes. The vines have all been killed prematurely and I failed to see a single plant free from the disease. The county agent estimates that there will be a loss of about 75% of the crop, due to the disease. Spraying of Irish potatoes is not practiced in the county."

South Dakota: (Champlin, August 1.) None in evidence here.
Virginia: (Fromme, August 1.) First appeared July 1 at Blacksburg, Most potatoes were practically mature at this time and little damage resulted except on late plantings. The disease was general over Montgomery County. It appeared earlier than usual and the damage is more than for some years. Tomatoes here will generally be almost a total loss from late blight.
West Virginia: (Giddings, July 25.) "Specimens of blight have just been received from Randolph County, and a record of it is at hand from Tucker County. The disease is evidently well advanced and I fear the loss will be extremely heavy in these counties."
Wisconsin: (Vaughan, August 1.) Found at Rice Lake, Barron County, July 26, by J. W. Brann, while on a summer inspection trip for seed certification. The area involved is about 1/2 acre and is in a low place in the field. The fungus was found fruiting on the lower leaves but not on the stems. Heavy rains have been experienced recently. Growers in the vicinity of Rice Lake have been warned of the presence of the disease and will equip for spraying.

Early blight caused by Macrosporium solani.

Alabama: (Peltier, June 1.) A few cases observed in the Gulf Coast section. Not serious.
Connecticut: (Clinton, August 1.) Present, but no damage observed.
Georgia: (Berry, June 1.) Reports for Savannah district. Attack not severe until about digging time.
(McClintock, August 1.) 25% of the plants seriously injured. In some fields spraying did not appear to hold the fungus in check as the sprayed fields developed blight about the same as those receiving no spray.
Indiana: (Gardner, August 1.) Observed in several parts of the state, but severity was limited.
Kansas: (Blachly, June 25.) "Early blight has been doing considerable amount of damage in the Kaw Valley, Kansas. Estimates of damage have been made in various towns in the Valley as follows: 35%, 35%, 35%, 35%, 20%, 25%, 25%. A few growers sprayed their late planted potatoes and I believe received considerable benefit thereby. The Cobblers are not affected very much by early blight. In fact I do not believe there will be over 10% damage to the Cobbler crop. Dry weather is setting in now and I think it will aid the late planted potatoes. A great many of the early planted fields have completely lost their foliage and the rest of them will drop their leaves within the next few days. This seems to be the worst epidemic of early blight that has been experienced in the Valley. In fact only a few growers have had any experience with it before."
Louisiana: (Edgerton, August 1.) More or less common in all fields, but not severe enough to cause any loss.
Maryland: (A. C. Martin, June 28.) Infection general in Worcester County, but not severe.
Massachusetts: (Osmun, August 1.) Unimportant the present season.
Mississippi: (Beal, June 1.) Very general this season. From observations in the field infection varied from slight to very heavy.
New Jersey: (Cook, August 1.) Abundant, but less than in 1918.
Oregon: (Barss, August 1.) One case reported.
South Dakota: (Champlin, August 1.) 50% on early varieties; 5-10% on late varieties. Frequent rains wash off the spray. A difficult disease to combat.
Tennessee: (Essary, August 1.) Very common in all parts. The loss is said to b

heavy in commercial potato sections, especially on the Cumberland Plateau.
Texas: (Taubenhaus, August 1.) Considerable, about 2% loss.
Virginia: (Fromme, August 1.) Common but not severe.
West Virginia: (Giddings, August 1.) Quite prevalent, especially in the southeastern section of the state. Evidently caused some injury even on the early crop.
Wisconsin: (Vaughan, August 1.) Small amount only.

Mosaic (cause undetermined).

Alabama: (Peltier, June 1.) About as bad as last year. Very prevalent throughout the state, especially on Triumphs.
Connecticut: (Clinton, August 1.) Less than usual. No complaints.
Georgia: (Berry, June 1.) Reports from all sections of the state but the mountain section. Individual reports of entire small fields being destroyed. Usually no tubers are formed. More destructive this season than combined effect of early and late blight.
(McClintock, August 1.) Developed on Triumph in more than 90% of all plants regardless of source of seed. Not especially serious on other spring crop varieties.
Idaho: (Hungerford, July 27.) Noted in the three counties, Twin Falls, Canyon and Washington, late in June. Slight amount in all cases.
Iowa: (Melhus, August 1.) Common on Bliss Triumph and Green Mountains. None found on Rural New Yorker.
Louisiana: (Edgerton) About 90% infection on Bliss Triumph. Scattered on other varieties. Loss not so great this year as last, as there was a smaller percentage of dwarf plants.
Massachusetts: (Osmun, August 1.) Generally present but obscure and not likely to reduce the crop so much as in previous years.
Mississippi: (Beal, June 1.) General in potato growing counties of the state.
New Jersey: (Cook, August 1.) About 25% for the state.
Oregon: (Barss, August 1.) One field of California White Rose reported with considerable mosaic.
Tennessee: (Essary, August 1.) Very little if any has been observed this season.
Texas: (Taubenhaus, August 1.) Trace or 1/2 to 1% observed here and there.
Virginia: (Fromme, August 1.) Slight at Blacksburg.
Wisconsin: (Vaughan, August 1.) Small amount only.

Leaf roll (cause undetermined).

Connecticut: (Clinton, August 1.) Comparatively little seen except on Dibble's Russet and no complaints. Apparently less than usual.
Idaho: (Hungerford, July 27.) None noted in fields examined.
Louisiana: (Edgerton, August 1.) A small percentage in many fields. In a few small patches the percentage of infection is high but in most of the commercial fields the loss caused was small.
Massahcusetts: (Krout, August 1.) Present in a large percentage of the fields. Most severe as a rule on native stock. Will undoubtedly very materially reduce the total production.
New Jersey: (Cook, August 1.) Less than usual. Abundant on Dibble's Russett which is grown to some extent in the northwestern part of the state.
Tennessee: (Essary, August 1.) Has been observed in a good many fields, but the damage seems to be slight.

Texas: (Taubenhaus, August 1.) 1/2-1% loss observed.

Scab caused by Actinomyces chromogenous.

Alabama: (Peltier, June 1.) Reported from all parts of the state and apparently is more severe than it has been the past three or four years. A large number of specimens that were so badly attacked as to be unfit for market have been examined. This and root rot are probably the most general diseases in Alabama.

Georgia: (Berry, June 1.) Especially noticeable in certain sections of the state. 90% of the tubers were affected in Lowndes County and in many of the mountain counties. It is especially severe this season.

Louisiana: (Edgerton, August 1.) Very common, with a rather heavy loss. Loss resulted mostly in high percentage of culls and a lower selling price for the potatoes.

Mississippi: (Beal, June 1.) Reported from a number of different counties, probably exists widely wherever seed is not treated before planting.

New Jersey: (Cook, August 1.) More abundant than usual.

Tennessee: (Essary, August 1.) Common and serious in the eastern section. There is more than the average amount of scab this season.

Tip burn, non-parasitic.

Connecticut: (Clinton, August 1.) A little observed, but not serious so far.

Iowa: (Bakke, July 1.) Common and destructive in the southern part of the state.

Massachusetts: (Krout, August 1.) Generally present and more severe than in previous years.

South Dakota: (Champlin, August 1.) 10% damage to early varieties.

Texas: (Taubenhaus, August 1.) About 3% loss.

West Virginia: (Giddings, August 1.) Quite prevalent, although we have had an unusually moist season. Loss this year indicates very clearly that Lutman is correct in ascribing much of this to the direct action of the sun. We have had a very few unusually clear, hot days.

Wisconsin: (Vaughan, August 1.) The combined leaf hopper and tip burn injury with considerable flea beetle work, has been extensive in the southern counties. Potatoes in the northern counties, where farmers make potato raising a business, are looking fine.

Stem rot caused by Rhizoctonia solani.

Alabama: (Peltier, June 1.) A few cases observed in the vicinity of Auburn.

Georgia: (Berry, June 1.) Reported from all over the state. In some cases the loss is as high as 5%.

Massachusetts: (Osmun, August 1.) About the usual amount.

New Jersey: (Cook, August 1.) Less than usual.

North Carolina: (Yocum, July 3.) Found rather frequently in the state, but not noted as serious at all except in one locality where it was unusually bad. It was supposed to have been brought in with Maine seed.

Black leg caused by Bacillus phytophthorus.

Indiana: (Gardner, August 1.) Found on several farms near Indianapolis affecting only occasional plants.

Iowa: (Melhus, August 1.) Common on early varieties. It commenced to appear during the latter part of June.

Oregon: (Barss, August 1.) Widespread and abundant. As high as 25% in some fields.

Vermont: (Lutman, August 1.) Observed by Gilbert near Rutland.

Other diseases.

Sclerotium wilt, caused by Sclerotium rolfaii, is reported as scattering in most fields in Louisiana with a loss of about 1%. No cases of stem end rot, due to this fungus, were observed in the Gulf Coast section by Peltier during the latter part of May. Potatoes in both field and grading sheds were gone over quite thoroughly. It was rather common in that section last year at that date.

A peculiar dwarfing of plants was noted in several fields in Idaho by Hungerford. The symptoms were not like those usually associated with curly dwarf as there was no curling of the leaves. Serious loss will occur in a number of fields from this trouble.

OATS

Smuts caused by Ustilago avenae and U. levis.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Covered smut was found in 38 of the 51 fields inspected in amounts ranging from a trace to 20% (average 4.2%).

Loose smut was found in 34 of the 51 inspected fields in amounts ranging from a trace to 20% (average 3.4%).

Kentucky: (Results of Cereal Disease Survey, June 11-18.) In the 14 fields examined loose smut was found in 4 fields as follows: 1, 1/4, 4, t. No covered smut was encountered. Only one of the fields was planted with treated seed.

New York: (Results of Cereal Disease Survey, July 8-18.) Loose smut was found in 31 of the 78 fields inspected, minimum infection a trace, maximum 14% (average .96%). Covered smut was found in 45 of the 78 fields in amounts ranging from a trace to 48% (average 3.3%). The seed sown in 28 of the 78 fields was treated, 18 with formaldehyde 1-1, 10 with formaldehyde 1-40. The treatments were generally successful in controlling the disease. Eight of the fields sown with treated seed was infected, six of them in very small amounts, and in the other two the percentage of smut was high probably due to some mistake in the treatment.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Covered smut was found in 17 out of the 33 fields inspected in amounts ranging from a trace to 10% (average 2.4%). None of the seed used in the 33 fields was treated.

Loose smut was found in 32 of the 33 fields in amounts ranging from a trace to 12% (average 3.7%).

South Dakota: (Champlin, August 15.) Two percent. Much of the seed is treated which accounts for the low percent of damage.

Leaf rust caused by Puccinia coronata.

Kansas: (Results of Cereal Disease Survey, June 12-22.) Reported from 33 out of the 51 fields examined in amounts ranging from 2-65% (average 15%). Found most often and in largest amounts in Anderson, Labette and Neosho

Counties. Three of the inspected fields were planted with Texas Red and all were infested. The variety was not given for three others, two of which were affected. All the rest were planted with Texas Rust Proof.

New York: (Results of Cereal Disease Survey, July 8-18.) Found in 23 out of 78 fields in amounts ranging from 5-25% (average infection 2.4%).

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) General, being found in 30 out of 33 fields inspected in amounts ranging from a trace to 60% (average 11.2%).

Stem rust caused by Puccinia graminis.

Kansas: (Results of Cereal Disease Survey, June 12-22.) One field out of 51 was reported as having a 10% infection of stem rust. The variety planted in this field, as in most of the fields in the state, was Texas Rust Proof.

South Dakota: 5% in early oats; 50% in late oats.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in only 3 fields as follows: 15% in Logan County, and 10 and 5% in Stephens County.

Blast (Cause undetermined).

Kansas: Present in amounts from very slight to abundant in 34 of the 51 fields examined.

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Observed in moderate to slight amounts in 5 out of 14 fields.

New York: (Results of Cereal Disease Survey, July 8-18.) Found in 31 out of 78 fields, in amounts from considerable to very abundant. Reported most often from Jefferson, St. Lawrence and Genessee Counties; in greatest amounts from Genessee County.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Recorded in 28 of the 33 fields inspected in considerable amounts.

Bacterial blight caused by bacteria.

Kansas: Found in slight amounts in only one field, in Phillips County, of the 51 inspected.

New York: Four of the 78 fields inspected were affected with bacterial blight in amounts ranging from very slight to considerable.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in 5 fields in Bryan County and 1 field in Stephens County in slight amounts.

Other diseases.

A disease said to be caused by Helminthosporium avenae was found in 20 New York fields of the 78 inspected in very slight to considerable amounts. Found in Jefferson and St. Lawrence Counties only.

Blotch, (cause not stated), was found in considerable amounts in one field in Dutchess County, New York.

RYE

Stem rust caused by Puccinia graminis.

Connecticut: (Clinton, July 15.) No complaints and no specimens seen this year

Michigan: (Coons, July 15.) Not observed at time of harvest.
New Jersey: (Cook, July 1.) Slight.
South Dakota: (Champlin, July 15.) Very little.
Virginia: (Results of Cereal Disease Survey, June 4-17.) Trace found in two out of the 6 fields inspected.

Leaf rust caused by Puccinia dispersa

Connecticut: (Clinton, July 15.) No complaints and little seen. Probably less than usual.
Michigan: (Coons, July 15.) Quite common at time of harvest. Damage slight.
South Dakota: (Champlin, July 15.) Very little.
Virginia: (Fromme, June 4-14.) Found in 5 out of the 6 fields inspected in amounts ranging from 10 to 65%. Found in largest amounts in Augusta County.

Stem smut caused by Urocystis occulta.

Kansas: (Melchers, July 15.) Noted in importation of seed which was planted.
Iowa: (Bakke, July 1.) General throughout state.
South Dakota: (Champlin, July 15.) A trace in Rosen rye from Michigan. Not in native rye.
Virginia: (Results of Cereal Disease Survey, June 4-14.) Traces in three out of the six fields inspected.

Scab caused by Fusarium spp.

South Dakota: (Champlin, July 15.) About 5% in most fields.
Virginia: Found in all of the 6 fields inspected in amounts ranging from a trace to 6%. Found in largest amounts in Augusta County.

Anthracnose caused by Colletotrichum cereale.

Iowa: (Bakke, June 15.) Seriously affecting rye in the southern part of the state, in one case 35% infection.
Virginia: (Results of Cereal Disease Survey, June 4-14.) Found in 6 out of 6 fields inspected; considerable and very abundant. Found in largest amounts in Augusta County.

Ergot caused by Claviceps purpurea.

Michigan: (Bessey, July 15.) Common, but not doing much damage. Brine treatment coming into use.

TOMATO

Leaf blight caused by Septoria lycopersici.

Alabama: (Peltier, July 15.) Prevalent throughout the state. Causing serious losses in some localities.
Indiana: (Clark, July 21.) Owing to the dry weather which has prevailed during the last three weeks, there is as yet practically no outbreak of Septoria in this section. I have not found more than three or four plants infected with it in a number of fields that have been gone over within the last week or so.

(Gardner, August 1.) Septoria leaf blight has been common in the greenhouse tomato crop of Indiana. It is beginning to show up in the field crop at present. It is expected that it will be very serious on the field crop because of its prevalence in 1918 and because few growers practice spraying.

Mississippi: (Beal, July 15.) Common in every county in which Fields and Tims have been, but damage usually slight. Very little spraying done to control.

Texas: (Taubenhaus, July 15.) Considerable in all tomato sections. Ten percent loss.

Early blight caused by Macrosporium solani.

Alabama: (Peltier, July 15.) Scattering over the state.

Louisiana: (Hollis.) General in all tomato sections visited during June and July causing rather slight damage in most cases but it was noted as very bad in Iberia Parish, where 20% reduction in yield is estimated. Practically all plants in that Parish were very badly affected. The large amount of rain was undoubtedly favorable for the disease.

Mississippi: (Beal, July 15.) Reported as being common by both Fields and Tims from almost every field seen. Damage usually slight.

Texas: (Taubenhaus, July 15.) Considerable in all tomato sections; 8% loss.

Fusarium wilt caused by Fusarium lycopersici.

Alabama: (Peltier, July 15.) Apparently not so serious as last year, as few reports have been received. Apparently, the introduction of the resistant varieties has influenced the reduction of this disease.

Indiana: (Gardner, August 1.) Fusarium wilt is undoubtedly the most serious trouble that greenhouse growers have had to contend with this year. It is very serious near Indianapolis, in some cases cleaning out entire houses. It has just been reported from Evansville on field tomatoes and has been found in Lake County.

Louisiana: (Hollis, July 15.) Common and causing rather severe damage in most localities visited in the state. Estimates of 10, 15, 25, 25 and 40% loss were made in different counties. In Iberville Parish four government wilt resistant varieties planted along with six commercial ones did not develop a single wilted plant while the commercial varieties showed considerable wilt. The government varieties were Arlington, Columbia, Marvelus and Norton. The commercial varieties were J. Baer, Glory, Maryland, etc.

Florida: (Clark, July 21.) The ten-acre field reported by Clark (Pl.Dis.Bul. 3:14, 1919.) later developed an average infection of 5-10% of the entire field, this being scattered, however, in areas of rather heavy infection interspersed with larger areas in which the infection was light or entirely absent.

During the first week in April a number of fields in the southern part of Dade County were visited. Fusarium was found in practically every field entered, in some cases running to 75 or 90% of the plants.

Mississippi: (Beal, July 15.) Most common and serious disease of the crop, excepting possibly blossom end rot. In all sections of the state.

Texas: (Taubenhaus, July 15.) Prevalent, but not serious; kept in check by rotation. One percent loss.

Bacterial blight caused by Bacillus solanacearum.

Alabama: (Peltier, July 15.) No reports or observations received at this sta-

tion this year.

Louisiana: (Hollis, July 15-18.) Found in Webster, Ouachita, Caddo and East Heliciana Counties, in amounts ranging from 2 to 20% (average damage about 10%).

Mississippi: (Beal, July 15.) Reported from two sections of Hancock County. Also found in George and Oktibbeha Counties. Probably widespread over counties along coast and long leaf pine section in south Mississippi.

Other diseases.

Blossom end rot is reported by Taubenhaus as causing 3% loss in Texas; and by Beal (Mississippi) as very general in the state and especially severe in the Crystal Springs area.

Wilt, caused by Sclerotium rolfsii, was found by Hollis on all tomatoes visited in Iberia County, and is reported by Peltier as causing serious loss in one instance in Alabama.

Collar rot (cause undetermined) has been causing a very great amount of damage in the southern half of Delaware this season. Many fields show a loss of 20% while in others the loss is total and the crop has been plowed up. Records were received at the Experiment Station from more than 75 farmers who were asking for help. LeCato has been able to find it in every locality visited. It was first reported June 9, occurring in the city beds. All varieties seem to be equally affected.

The disease causes a black stem, at or near, the surface of the ground and affected plants sooner or later may break off at this point of infection.

Mosaic is reported by Babcock June 19 from Ohio as occurring abundantly on some 4,000 tomatoes in greenhouses.

Root knot, caused by Heterodera radicicola, is reported from Mississippi and Louisiana.

Leaf mold, caused by Cladosporium solani, is reported by Gardner from Indiana August 1, as serious in the greenhouses near Indianapolis. Some of the worst infections ever reported to the Station were observed this year. Infections ranging from 25-100%.

A blight of tomatoes probably the same as that occurring in Washington and Oregon is reported in the Idaho Bi-weekly News Letter, July 25, as having made its appearance in both northern and southern parts of Idaho this season.

WHEAT

Bunt caused by Tilletia spp.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Bunt was found in one field (Hempstead County) of the 12 inspected. The infection was severe, being 23%. This field was one of the 3 for which the seed had not been treated; the seed for the other 9 fields had been treated with formaldehyde 1-40.

Colorado: (Leach, July 15.) Universally present, varying from a trace to 25 or 30% and higher. Treatment has proven effective where practiced.

Iowa: (Melhus, August 1.) State average about 2%.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Bunt was found in 27 of the 114 fields inspected, in amounts ranging from a trace to 50% (average 1%).

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 21 fields out of 163 inspected in amounts of 1% or less except in one case where 48% of the heads were affected. The average percentage of bunt in all

fields was only .3%. The seed for 63 of the fields was treated, 22 with formaldehyde (wet) and 41 with copper sulphate.

New York: (Results of Cereal Disease Survey, July 8-18.) Reported from 34 out of 100 fields in amounts ranging from a trace to 16% (average .5%). Found in greatest amounts in Herkimer County and most frequently in Erie and Niagara Counties.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in 12 out of the 98 fields examined in percentages as follows: t, 1, t, 3, 20, 1, t, 1, 1, 1, t, t, (average about .2%). Practically all the bunt was found in Jackson and Kingfisher Counties although examinations were made in 15 other counties. Only 5 fields were sown with disinfected seed.

Virginia: (Results of Cereal Disease Survey, June 6-14.) Found in 17 out of the 59 fields inspected, in amounts ranging from a trace to 9%. Found most frequently in Orange County. Twelve percent, or 3 out of the 24 fields of Bearded Winter wheat, and 33%, or 5 out of the 15 fields of Stoner wheat, were affected. One out of the 5 fields sown with seed which had been treated with formaldehyde had 1% infection.

Washington: (Heald, July 15.) Apparently more than last season, due to larger acreage of winter wheat. None to 55% in farm plantings.

Scab caused by Fusarium spp.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) A trace of scab was found in 3 of the 12 fields inspected, all in Clay County. Two had been planted to wheat the year before, one to cowpeas.

Colorado: (Leach, August 1.) None observed in the state this year.

Idaho: (Hungerford, August 1.) No scab reported.

Iowa: (Melhus, August 1.) Percentage on affected heads in the state will average about 40%.

(Bakke, June 28.) General throughout the state. In the winter wheat growing sections of Johnson and Linn Counties this is the outstanding pathological trouble. In practically all cases 35% of all heads are affected. However, it rarely happens that more than one-fourth of the glumes are included.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Scab was found in small amounts, averaging not more than 1% in 33 fields out of 114 examined. The greatest infection in any one field was 5%. One of the infested fields had been planted to corn the year before; all the others had been in wheat.

Kentucky: (Results of the Cereal Disease Survey, June 11-18.) Found in all but 3 of the 163 fields examined in amounts ranging from a trace to as high as 75%, affected heads (average 6.8%). Of the fields with scab about 24% of them were planted with corn in 1918, 24% with tobacco and 15% each with wheat, clovdr, and legumes, such as peas, beans, etc.

Maryland: Scab was found in 123 out of the 164 fields inspected in 15 Maryland counties. It varied in amounts from a trace to as high as 80% (average 5.2%). Of the 123 fields with scab 71 had been planted with Indian corn the year before, 3 with wheat, 12 with other crops, such as tobacco, tomatoes, etc. The rotation was not recorded for 35 fields. No particular variety was noticed as especially susceptible or resistant.

Michigan: (Bessey, July 15.) Not observed on wheat.

New Jersey: (Cook, July 1.) Less than in 1918.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in only 9 out of 98 fields in the following small percentages: 2, 10, 5, 2, 1/2, 1/2, 2, 1, 2.

Oregon: (Barss, August 1.) None reported.
Pennsylvania: (Orton, June 21.) Beginning to appear generally. In fields which follow corn the infection is about 10% on the average and where corn was not the previous crop the infection is about 3-4%.
South Dakota: (Champl in, July 15 and August 1.) Twenty-five percent to 75% on Marquis, and 15-40% on Durum. Usually the later varieties scabs more than Marquis but this year the reverse is true. In the eastern third of the state it was estimated that 25% or more of the Marquis wheat was affected on July 15. The amount of scab varies greatly in different localities. For example, at Clark 1-3% infection is recorded, while at Redfield 25% or more occurs. At Clark the crop is a little later and more rotation is practiced. Redfield is a place of continuous wheat cropping or corn followed by a number of crops of wheat.
Washington: (Heald, July 15.) None.
Wisconsin: (Vaughan, August 1.) Serious, more than ever before. Estimated losses range from 10-50%.
Virginia: (Results of Cereal Disease Survey, June 4-14.) Found in 59 out of the 59 fields inspected in amounts ranging from a trace to 26%. One hundred percent of the fields sown with bearded winter and 100% of the fields sown with Stoner wheat were infested. Found in greatest amounts in Orange County.

Loose smut caused by Ustilago tritici.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Loose smut was present in amounts ranging from a trace to 6% (average 1.8%), in each of the 12 fields inspected. No hot water treatments were made.
Iowa: (Melhus, August 1.) Percentage of affected heads in the state about 1%.
Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 135 of the 163 inspected fields. The disease ran as high as 10-15% in a few fields but as a rule the percentages were low, averaging .8% for the state as a whole. No treatments with hot water are recorded.
Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Found in 143 fields out of the 164 inspected in amounts ranging from a trace to a maximun of 20% (average 3.6%). It will be seen that the disease was much more frequent than bunt and causing a considerably heavier loss. Only one field of wheat was found where the seed had been treated with hot water. No particular differences in the susceptibility of varieties was noted.
New York: (Results of Cereal Disease Survey, July 8-18.) This disease was reported from 60 of the 100 fields inspected, in amounts ranging from a trace to 5% (average .4%). No hot water treatments were recorded. There is no apparent difference in the susceptibility of varieties.
Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Common in small percentages. Found in 73 out of the 98 fields examined in amounts ranging from a trace to as high as 12% (average 1.8%).
Pennsylvania: (Orton, June 21.) Very prevalent in all the counties visited. Infection seems most serious in Cumberland and Adams Counties where the average infection, by counting heads, will run about 5% with many fields more, some running up to 10-12%.
Virginia: (Results of Cereal Disease Survey, June 4-17.) Found in all of the 59 fields inspected, in amounts ranging from a trace to 15%. No hot water treatments were made.
Washington: (Heald) Small amount.

Stem rust caused by Puccinia graminis.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Reported from all of the 12 fields inspected. Infection ranged from 5-65% (average 20%).

Colorado: (Leach, August 1.)/ First found at Loveland, July 16. Has since become general over northern part of state and probably elsewhere. The rust did not reach a severe epidemic stage in any place as it came too late. Severe infection on grasses and wheat was found near barberry hedges at one place near Loveland.

Idaho: (Hungerford, August 1.) Very little stem rust reported from any part of the state. Season has been extremely dry and there has been less rust than usual according to reports.

Iowa: (Melhus, August 1.) Infection averages 20%.

(Bakke, June 15.) An interesting rust transference relation was noted on June 9 at Harcourt, Iowa, a short distance from Fort Dodge. There is a barberry hedge, 100 yards long, 6 feet tall and 20 years old. Just west of the hedge is a spring wheat field and along the fence a large amount of Hordeum jubatum. On this day the uredo spores of Puccinia graminis were found upon this grass. Microscopic examination made of spores and measurements show that it was the stem rust, P. graminis.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Found in 68 of the 114 fields inspected in amounts ranging from a trace to 25% affected leaf and stem area (average 4.6%).

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in slight amounts in 14 widely separated fields. Average trace.

Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Observed in 83 out of the 164 fields in amounts ranging from a trace to a maximum of 15% (average 2%) affected stem and sheath area.

Michigan: (Bessey and Nelson, July 15.) Just beginning to appear at time of harvest. Damage slight.

New Jersey: (Cook, July 1.) Very little.

New York: (Results of Cereal Disease Survey, July 8-18.) Found in 15 fields out of 100 inspected, in amounts ranging from a trace to 5% (average .16%).

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Prevalent, being found in 89 of the 98 fields inspected. Percentage affected stem and leaf area as high as 65% in some cases with an average of 13.6% for the 98 fields.

Oregon: (Barss, August 1.) None found in commercial fields.

South Dakota: (Champlin, July 15-August 1.) About 50-100% infection on common wheat and 5-20% on Durum.

Virginia: (Results of Cereal Disease Survey, June 4-17.) Found in 19 out of the 59 fields inspected, only a trace in each case. Forty-two percent or 8 out of the 19 fields sown with bearded winter and 40%, or 6 out of the 15 fields sown to Stoner wheat were infested.

Washington: (Heald, July 15.) Very small amount in eastern Washington. No appreciable damage. One case of heavy infection from Pierce County.

Wisconsin: (Vaughan, August 1.) More than reported for many years. Especially serious on late plantings. Plants infected range from 0-100%. Few fields free from rust.

Leaf rust caused by Puccinia triticina.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Observed in large amounts, from 40-100% (average 57.5%), in all of the 12 fields visited.

Only one field was totally diseased.

Colorado: (Leach, August 1.) First found near Rocky Ford June 1, where it reached the epidemic stage, doing considerable damage in many fields. It was present in small quantities in practically all places.

Idaho: (Hungerford, August 1.) A trace to 10% of leaf rust noted in various localities visited. Practically no damage evident to date.

Iowa: (Melhus, August 1.) Fifty percent infection.

(Bakke, June 28.) Much leaf rust, about 70%. Five percent present in Clayton County, near McGregor, and 10% near Mason City.

Kansas: (Results of Cereal Disease Survey, June 13-24.) One hundred and eight of the 114 fields inspected were affected from 2-100% (average 27.2%).

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Observed in 117 of the 163 fields inspected. Average percentage affected leaf area was 18.8%.

Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Generally prevalent as it was found in 142 fields out of 164 examined. From 3 to 100% leaf area (average 42%), according to the scale for estimating rusts, was found to be affected.

Michigan: (Bessey and Nelson, July 15.) Very common this year. All fields observed severely rusted, worse on spring wheat.

New Jersey: (Cook, July 1.) About as usual.

New York: (Results of Cereal Disease Survey, July 8-18.) In 46 fields out of 100 inspected, minimum infection 5%, maximum 60%, average 10.4%.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Common but not destructive apparently. Found in 86 of the 98 fields inspected with an average of 30.5% affected leaf area.

Oregon: (Barss, August 1.) Very small amount reported from several sections. Apparently widespread but never abundant.

Pennsylvania: (Orton, June 21.) Extremely prevalent and severe throughout the southeastern part of the state. The infection averages 95%, and most fields show no trace of green leaves. This section includes Delaware, Chester, Philadelphia, Dauphin, Cumberland and Adams Counties. Judging from the appearance of the fields from the railroad the same condition exists in Lancaster, Northampton, Bucks and Montgomery Counties. As we get in the more mountainous sections the infection is not so serious. There will be a fair crop although the heads seem short and taper off at the tip.

South Dakota: (Champlin, July 15-August 1.) Fifty percent to 100% on leaves of Turkey Winter and 40-80% on Marquis. Forty percent on common wheat. Very little on Durum.

Virginia: (Results of Cereal Disease Survey, June 4-17.) Found in all of the 59 fields inspected ranging from 10-65%.

Washington: (Heald, July 15.) Small amount. Can be found in many fields. No appreciable damage.

West Virginia: (Berg, July 14.) Fairly abundant in all the counties visited by Mr. Berg on a trip during the latter part of June.

Wisconsin: (Vaughan, August 1.) Present and causing serious defoliation on late plantings.

Black chaff caused by Bacterium sp.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Eight fields out of 12 were infested with black chaff in amounts ranging from slight to considerable.

Colorado: (Leach, August 1.) Several isolated cases reported during June, mostly from irrigated sections of south central part of state. Not very

severe in any case.

Idaho: (Hungerford, August 1.) Slight infection in Washington County. None elsewhere to date.

Iowa: (Melhus, August 1.) Average percentage infection 5%.

Kansas: (Results of Cereal Disease Survey, June 12-22.) Found in 68 of the 114 fields visited, in amounts from very slight to very abundant.

Michigan: (Bessey & Nelson, July 15.) None reported.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Very common being found in 70 out of 98 fields examined and wheat was observed in 17 counties in the state. The disease ranged from very slight in some fields to very abundant in others. On the average it may be said to be moderate in severity and not causing heavy losses. Seventy-one percent of the 28 fields of Mediterranean Blue Stem and 61% of the 23 fields of Turkey Red were affected.

Oregon: (Barss, August 1.) None found.

South Dakota: (Champlin, July 15.) Two to five percent in some fields. As a rule less than one percent.

Washington: (Heald, July 15.) None.

Wisconsin: (Vaughan, August 1.) Very limited.

Anthracnose caused by Colletotrichum cereale.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Found in amounts ranging from slight to considerable in 5 out of 12 fields.

Kansas: (Results of Cereal Disease Survey, June 3-17.) Anthracnose was reported from 21 of the 114 fields inspected, in amounts from very slight to abundant. One field was reported with 20% infection.

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 15 of the 163 fields occurring in slight amounts in spots.

New Jersey: (Cook, July 1.) Very common and apparently very destructive.

New York: (Results of Cereal Disease Survey, July 8-18.) Found in 19 fields out of 100, reported in amounts from very slight to considerable.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Found in very small amounts in 8 fields out of 98 inspected.

Virginia: (Results of Cereal Disease Survey, June 6-14.) Found in 45 out of the 59 fields inspected in amounts ranging from very slight to very severe. Fifty percent, or 12 out of the 24 fields sown with bearded winter and 100%, or 15 out of the 15 fields sown with Stoner wheat, were infected. Found in largest amounts in Amherst County.

Glume and leaf spots caused by Septoria spp.

Arkansas: (Results of Cereal Disease Survey, June 6-10.) Five fields out of 12 were reported as having Septoria present in very slight, slight or considerable amounts.

Iowa: (Melhus, August 1.) Average infection 1%.

Kansas: (Results of Cereal Disease Survey, June 12-23.) Reported as being very slight to abundant in 43 out of 114 fields.

Kentucky: (Results of Cereal Disease Survey, June 11-18.) Found in 124 fields out of 163, causing moderate to severe infection, particularly of the heads. One field showed 95% head infection.

Maryland: (Results of Cereal Disease Survey, June 11-July 8.) Septoria was recorded, especially on the heads, in 67 out of 164 fields. In fields where the disease occurred it was usually reported as being abundant to very abundant.

New York: (Results of Cereal Disease Survey, July 8-18.) Reported as being found in amounts from very slight to abundant in 48 fields out of 100.

Oklahoma: (Results of Cereal Disease Survey, June 3-10.) Common on heads and leaves being found in 40 out of the 98 fields examined.
South Dakota: (Champlin, August 1.) Severe on Durum wheat. Some on common wheat.
Virginia: (Results of Cereal Disease Survey, June 6-14.) Found in all of the 59 fields inspected in amounts ranging from slight to very severe. Found in largest amounts in Orange County.
Wisconsin: (Vaughan, August 1.) Often found on heads following or accompanying scab.

Other diseases.

Dying of wheat in patches was reported by Fromme from Virginia in Page, Rockingham and Roanoke Counties on July 1. The cause of the trouble is as yet undetermined.

Foot rot, said to be due to Helminthosporium, is reported from Colorado by Leach, June 30 as follows: "You may be interested to know that one of the fields which I suspected as being affected with "take-all" has been found to be a very severe infection of Helminthosporium. I have plated out a large number of diseased plants and from nearly all of them secured a pure culture of Helminthosporium. Other fields which I inspected proved to be a lighter case of this trouble, drought injury or over irrigation. I am beginning to feel that the disease does not occur in the state and sincerely hope that I am right."

Foot rot, the causal organism for which it has not yet been determined, was reported by Heald from Washington, July 15. It has been found in the following counties: Thurston, Moscow, (west side) Spokane and Klickitat (east side).

Root rots, caused by various organisms, particularly Rhizoctonia, are by Bessey from Michigan, July 15. Some damage on heavy soils. The roots were partially or entirely destroyed, damage to crops varying, depending on degree of injury.

White-head: As a result of the cereal disease survey in Kansas, white-heat was reported from 8 of the 114 fields inspected. Two fields showed 25%, 3 had 5% and 3 had considerable. Melchers, also, reports it as common in many wheat fields.

Ergot, caused by Claviceps purpurea, Tul., is reported by Vaughan from Wisconsin, August 1, as occurring in Rock, La Cross, St. Croix and Burnett Counties. Ergot is also reported by Bessey and Nelson from Michigan, July 15, as common but not doing very much damage. Brine treatment coming into use.

Weather injury, is reported by Bessey and Nelson, July 15, as follows: Many fields showing effects of wet, cold spring followed by continued hot and dry weather. Heads not well filled in many cases. Yield reduced 1-2%.

Stripe; As a result of the cereal disease survey, July 8-18, in New York, the disease was found in 2 fields in Onondaga County, and one field in St. Lawrence County - only 3 fields out of 100. Each field was infested to the extent of 5%.

Frost injury was reported by Heald from Washington July 15 as causing considerable loss just as the wheat was heading. Some fields were a complete loss, in others scattered, unfilled heads or blighted tips or butts were the result.